

REMARKS

Claims 1-8, 11 and 12 are pending in this application. Claims 1 and 8 have been amended. New claims 12 and 13 have been added. No new matter has been introduced.

Claims 1-8 and 11 are rejected under 35 U.S.C. §102(b) as being anticipated by Gentry et al. (U.S. Patent No. 6,261,441) (“Gentry”). This rejection is respectfully traversed.

Gentry does not anticipate the subject matter of claims 1-8 and 11. Gentry discloses a two-step process comprising a hydrocracking stage of a hydrocarbon feed using a first catalyst followed by a catalytic dewaxing stage of unconverted hydrocracker bottom using a second catalyst. The bottoms streams obtained from each step are maintained separately from one another during processing, and the bottoms fraction from the dewaxing stage may be recycled to the hydrocracker or used as lube base stock. Among the products separated in Gentry are naphtha, middle distillates and C₄ material suitable for LPG (column 1, lines 13 to 23).

Contrary to the process of Gentry, the process of the claimed invention employs only one type of catalyst in a hydrocracking step to selectively produce one product, i.e., middle distillates.

During the hydrocracking stage disclosed in Gentry, the acidity function is provided by large pore zeolites (among them being mentioned zeolite beta). However, no information is given in Gentry relating to zeolite beta. According to Gentry, preferable are rare earth exchanged zeolite X and Y, REX and REY and, particularly preferable, is ultra stable zeolite Y, USY. Further, if hydrocracking is carried out at low to moderate hydrogen pressure to obtain a major portion of middle distillates, then the middle distillate produced is aromatic in character (column 8, lines 16 to 23 and 55 to 67, and column 9, lines 1 to 4).

It is clearly stated in Gentry that the middle distillates produced in the hydrocracking stage are unsuitable for use directly as jet fuel or diesel, and that they can only be used as a blending component for diesel fuel in combination with other, more highly paraffinic components.

This is contrary to the products obtained with the process of the claimed invention where the selectivity to middle distillates can be as high as 73.9%, obtainable by using a support with an IEC-acidity index of 0.341 (see Table 4). Thus, a person skilled in the art would not have been motivated to selectively prepare middle distillates by hydrocracking with a zeolite catalyst such as beta, REX, REY or USY, since Gentry indicates that the process is not selective to middle distillates and aromatics are also obtained together with the product. In fact, Gentry teaches away from the claimed invention with respect to the first hydrocracking stage, and further gives no indication on the role that the ion exchange capacity combined with the zeolite content has in determining the selectivity to middle distillates.

In the Office Action, the Examiner refers to the second stage where dewaxing is carried out on the bottoms fraction from the first hydrocracking stage using a zeolite beta. This stage is a low pressure isomerisation stage limited to conversion of the hydrocracked bottoms fraction, which has low heteroatom content. It is stated that the catalyst has high selectively for the isomerisation of waxy, linear or near linear paraffins to less waxy, isoparaffinic products (column 12, lines 15 to 18).

This second stage of dewaxing and isomerisation is different from the process of the claimed invention, as the process of the present invention is not concerned with the formation of isomers. Contrary to Gentry, the catalyst used in the process of the claimed invention has surprisingly been found to be suitable for the selective preparation of middle distillates from a hydrocarbon feed that is not limited to low heteroatom content. Any hydrocarbon feed can be selectively converted to middle distillates using the zeolite beta catalyst with an IEC-acidity index of less than 3.7.

Gentry discloses a beta zeolite possessing outstanding activity for paraffinic isomerisation in the presence of aromatics (column 12, lines 46 to 50). There is no indication, however, that the beta zeolite possesses high selectivity for middle distillate preparation.

Gentry therefore teaches away from the invention with respect to the second hydroisomerisation stage, and further gives no indication on the role the ion exchange capacity combined with the zeolite content has in determining the selectivity to middle distillates.

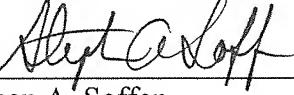
Gentry discloses typical contents of the zeolite composited with the matrix material to form the finished catalyst in typical ratios of 80:20 to 50:50 (column 13, lines 38 to 47). The content of beta zeolite in the catalyst support used in the process of the claimed invention is less than 50 wt% (i.e., outside the range disclosed in Gentry).

Gentry does not disclose any examples which could have been useful in calculating IEC-AI values and one skilled in the art could not possibly calculate these values.

Allowance of all pending claims is solicited.

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